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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,200	09/03/2003	Koichi Kawashima	60188-641	1760

20277 7590 10/18/2005

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WASHINGTON, DC 20005-3096

EXAMINER
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AHMED, SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/653,200

Applicant(s)

KAWASHIMA, KOICHI

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 5-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 7/27/05 have been fully considered but they are not persuasive. Applicants argue that none of the cited references teach an etching process including the step of simultaneously etching the layer to be etched with the step of etching the deposits deposited on both side faces of the resist pattern.

In response, examiner states that the argument is not persuasive because modified Lee et al teach that all the etching gases and the substrate to be etched are exactly same as the instant invention and expected to have the same result such as at least part of the deposits on the resist pattern would have been etched during the etching process (see the paragraph 8 at page of the previous office action).

Furthermore, The performance of two steps simultaneously, which have previously been performed in sequence was held to have been obvious. *In re Tatincloux* 108 USPQ 125 (CCPA 1955).

As regards to Chou ('277 patent), applicants' argument is persuasive to overcome the rejection.

Therefore, the rejection of the previous office action is repeated here in as below:

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 5-14 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (6,569,778) in view of Carmody et al (5,549,784).

Lee et al disclose a patterning process including the steps of:

- Forming a film (24,25) to be etched over a semiconductor substrate;
- A resist pattern (26) is formed on the film to be etched, wherein the resist pattern is formed using an ArF exposure source; and
- Etching the film to be etched using the resist pattern as a mask using fluorine –based gas and argon gas, wherein a large amount of polymer (28) is being deposited on both side faces of the resist pattern (col.3, lines 44-60).

Lee et al also teach that the etching process uses etching gases for allowing etching using a gas mixture of  $\text{CF}_4$  and oxygen and polymer forming condition using gas mixture of Ar and  $\text{CH}_2\text{F}_2$  or  $\text{CHF}_3$  (col.5, lines 19-25 and lines 42-50 to col.6, lines 15).

Lee et al further teach that at the end of the etching process, the etched feature is free from the polymer deposits (col.6, lines 16-30).

Therefore, the above-mentioned process of sequential etching and deposition and etching to remove the deposited polymer material reads on the claimed limitation of “etching the film to be etched so that no deposits are deposited”.

Lee et al fail to teach the first etching gas is  $\text{SF}_6$  instead of  $\text{CF}_4$ .

However, in a method of etching dielectric material, Carmody et al teach that the fluorine gas comprises any one of  $\text{CF}_4$  and  $\text{SF}_6$  (col.4, lines 20-25).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to replace  $\text{CF}_4$  of Lee et al with the  $\text{SF}_6$  of Carmody et al because both the fluorine containing gas are functionally equivalent as taught by Carmody et al.

Modified Lee et al fail to explicitly teach that the steps of etching the film and etching the deposits deposited on both sides of the resist pattern are simultaneous.

However, modified Lee et al teach that all the etching gases and the substrate to be etched are exactly same as the instant invention and expected to have the same result such as at least part of the deposits on the resist pattern would have been etched during the etching process.

As to claims 6-7, and 11, the desired pattern size would have been obvious because all the etching constituents such as the gas mixture of  $\text{SF}_6$ ,  $\text{CHF}_2$  and oxygen are similar as the invented ones and expected to have similar effect.

As to claims 15-16, Lee et al teach that the etching is performed at substrate temperature range of 20-100 degree C (col.5, lines 54-59).

However, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to optimize the claimed temperature range, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCAP 1980).

***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shamim Ahmed  
Primary Examiner  
Art Unit 1765

SA  
October 12, 2005